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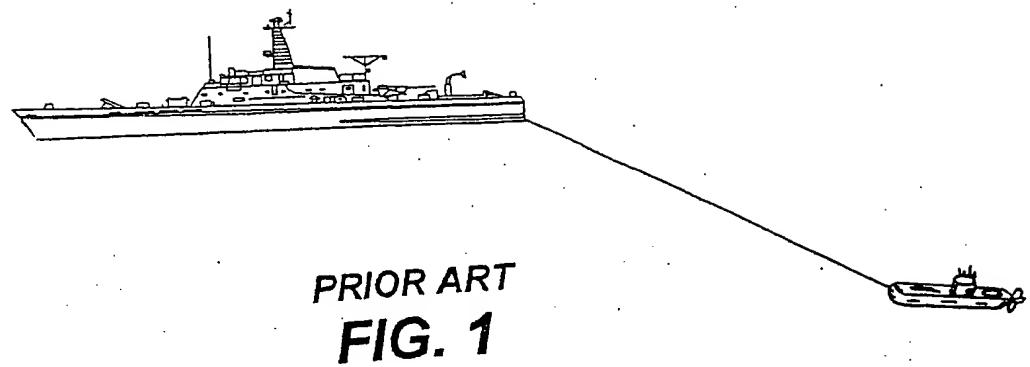
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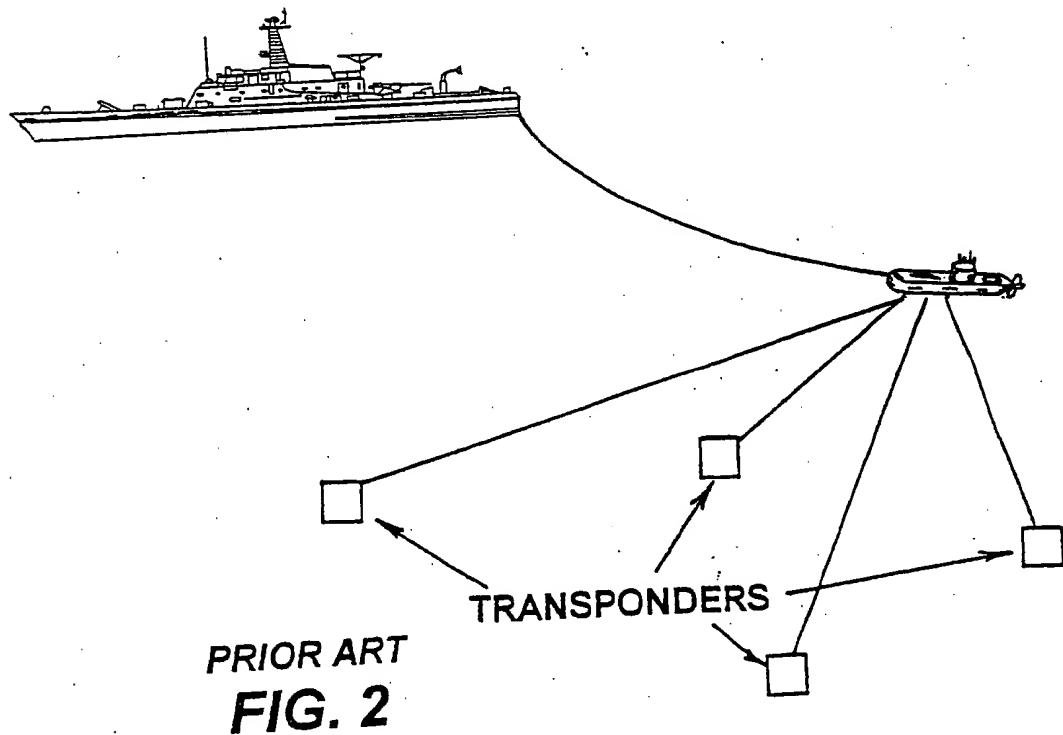
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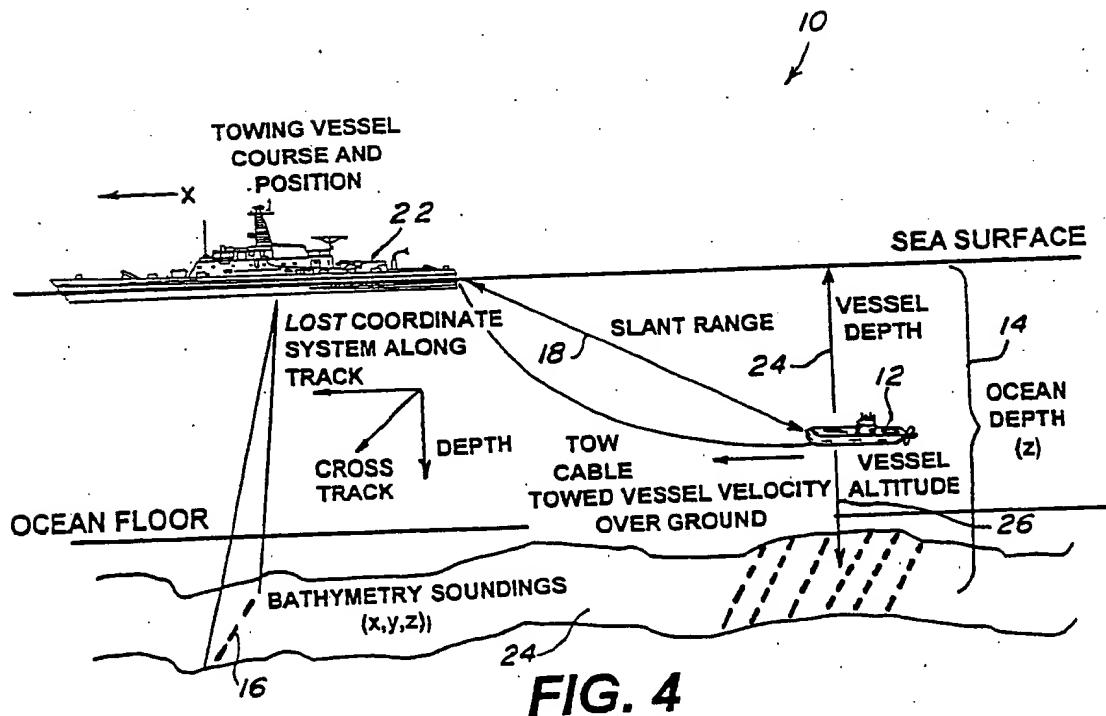
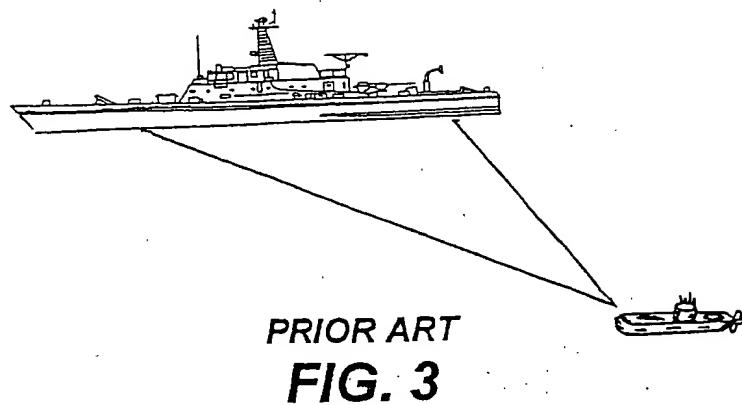
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PRIOR ART
FIG. 1



PRIOR ART
FIG. 2



PRIOR ART

PPF PPF PPF

520

POSITION (TRANSPOINTER)

KINEMATIC POSITION

SALT FENCE

560

OCEAN SURFACE

530

VESSEL DEPTH

590

Velocity

570

510

VESSEL APPROX.

540

BATHYMETRIC SOUNDINGS

550

1000 - 2

EXAMPLE OF LOST 2 EMPLOYEES
MULTIPLE UUV's

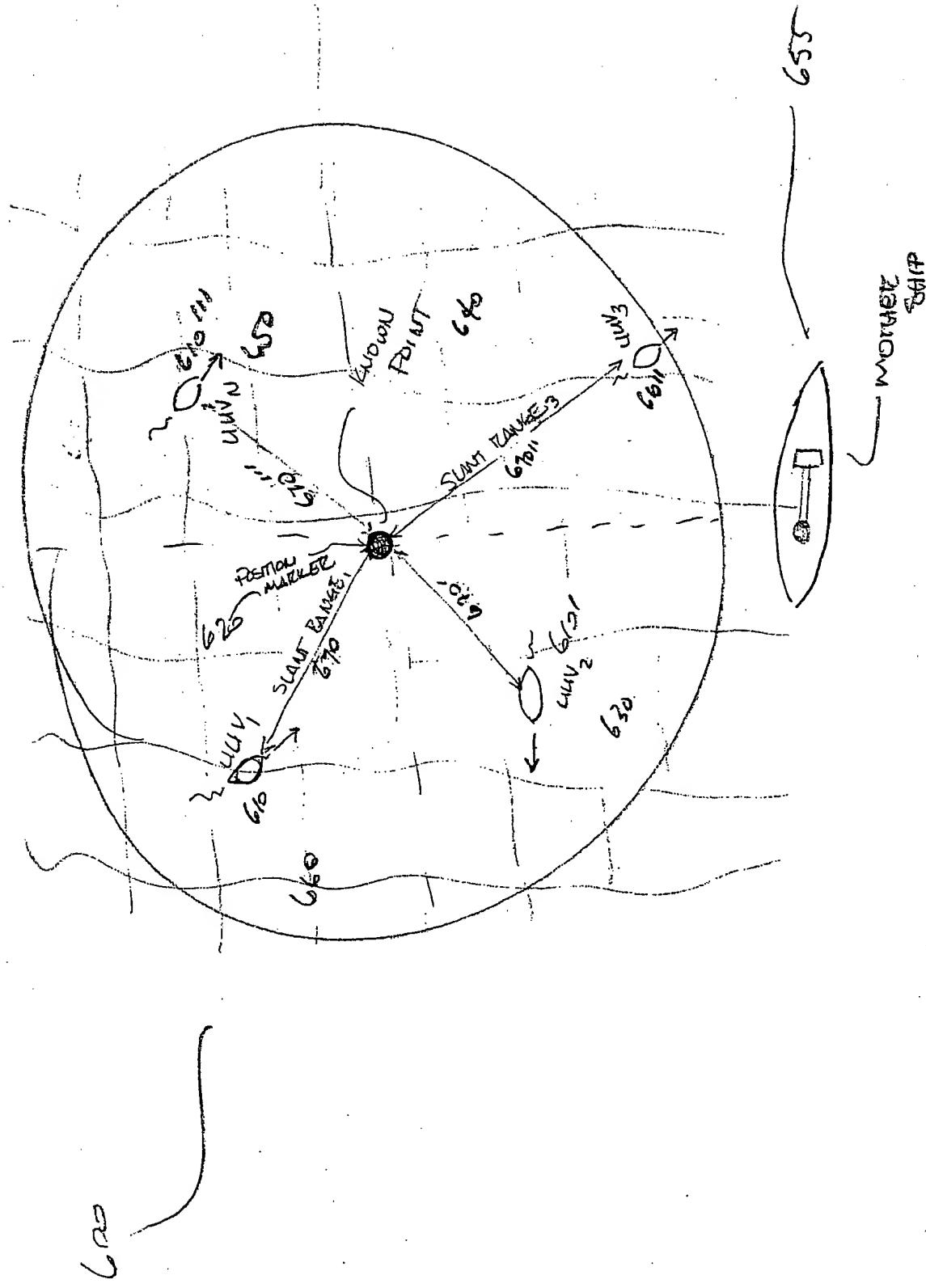
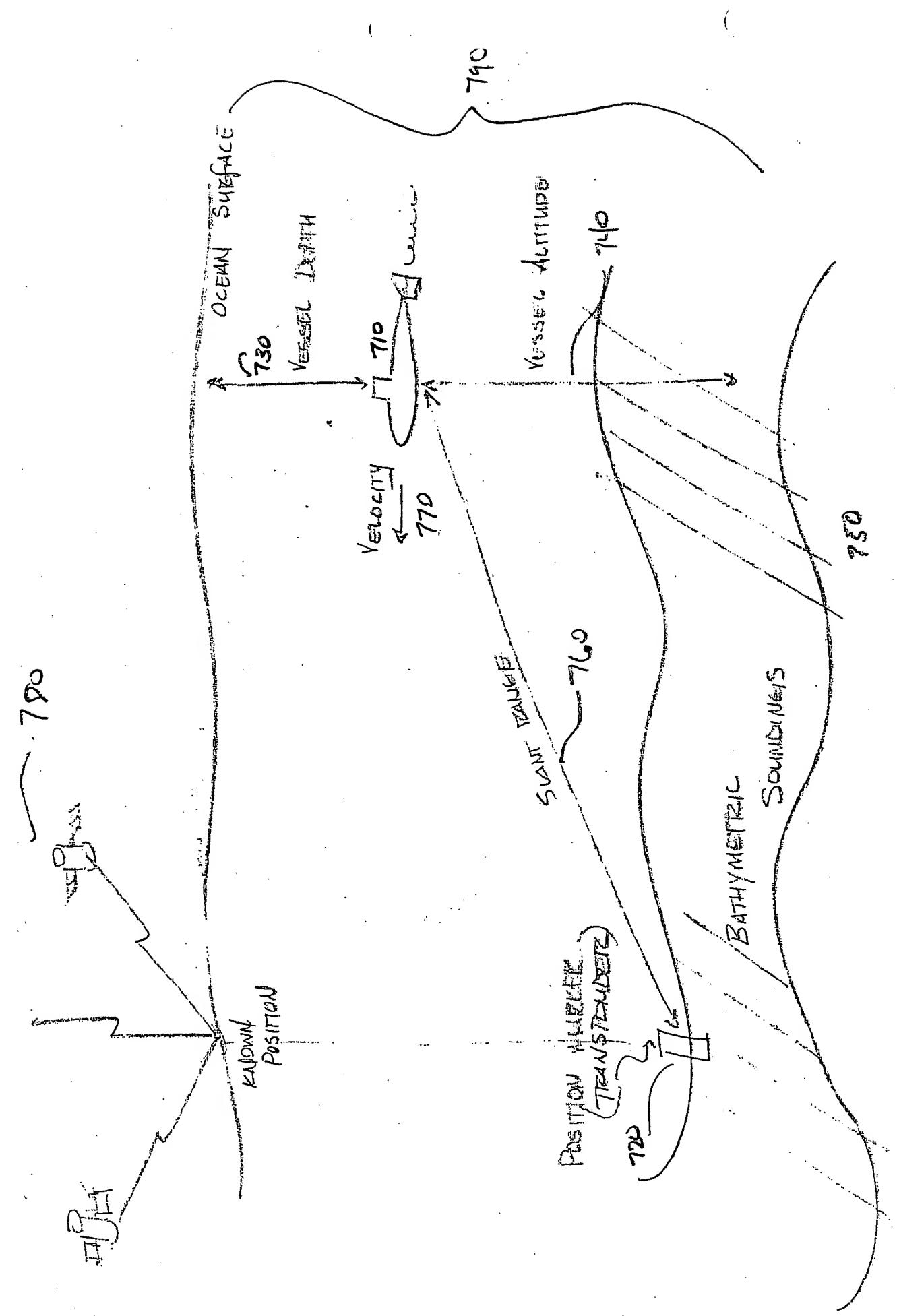
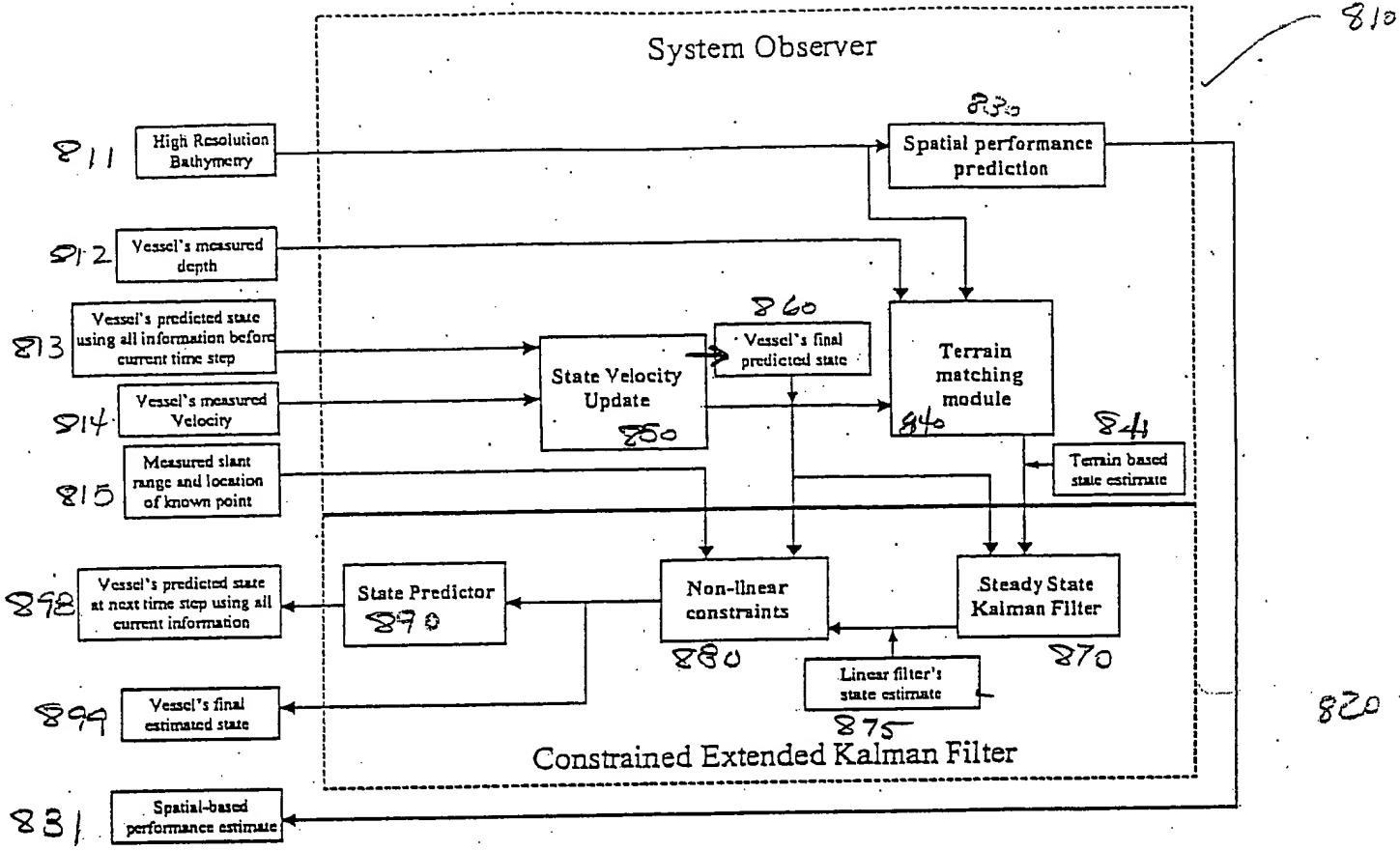


Figure 6



Lost - 2

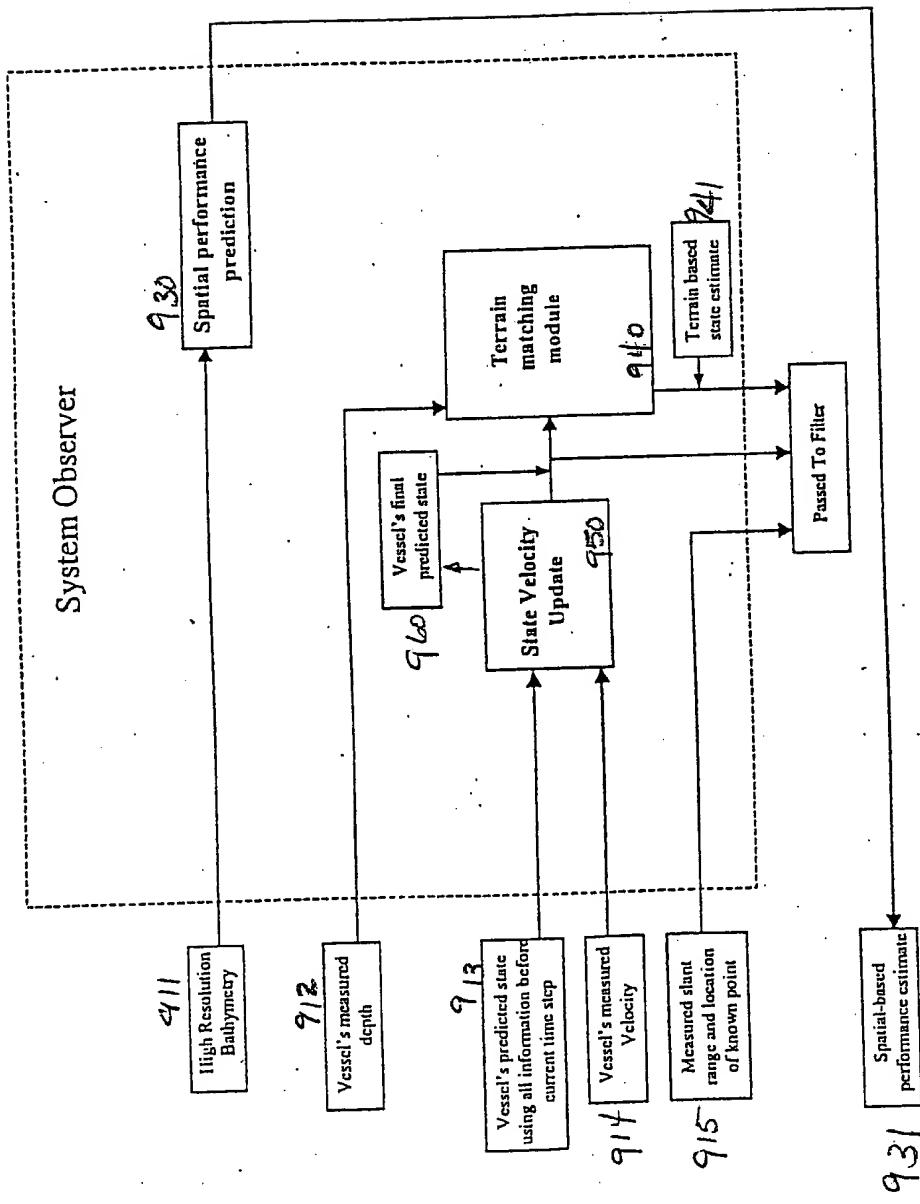
FIGURE 7

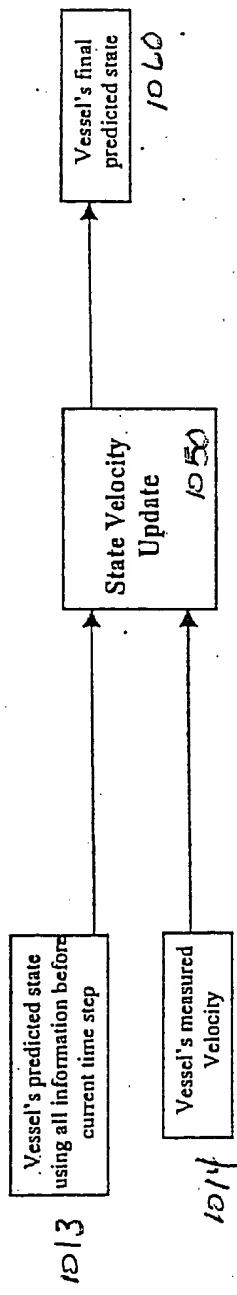


Block diagram of the system showing the two primary subsystems

FIGURE 8

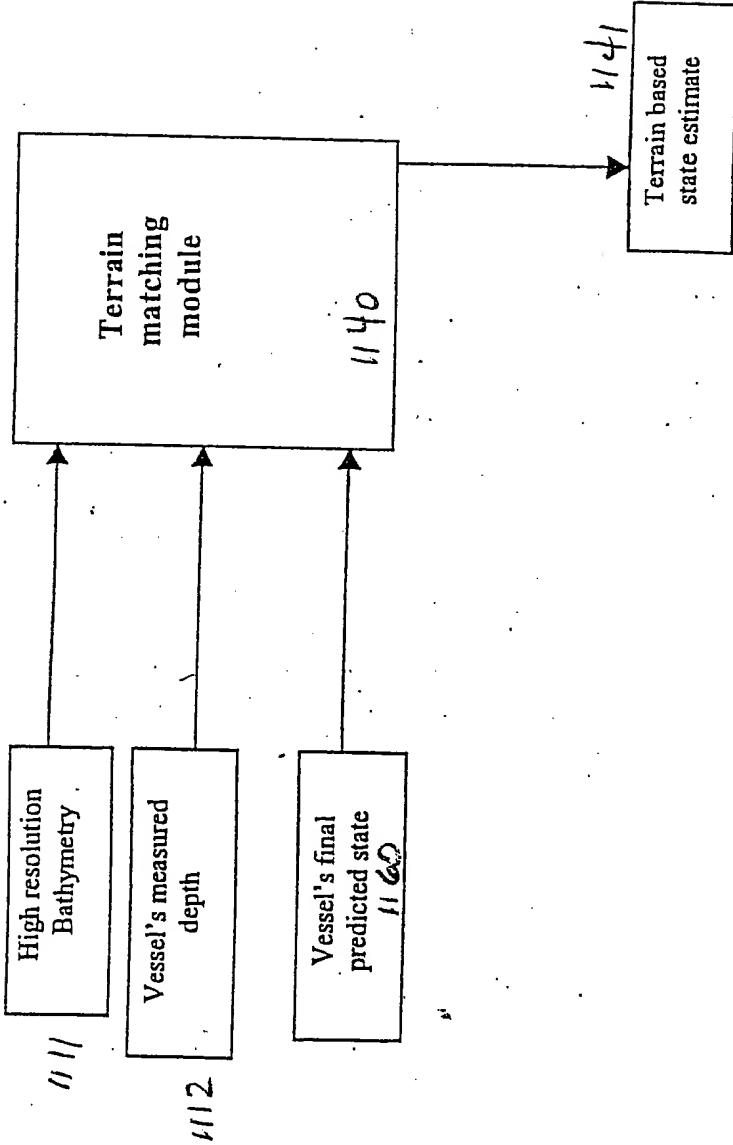
Figure 9
 Block diagram of the system observer subsystem showing the signal flow





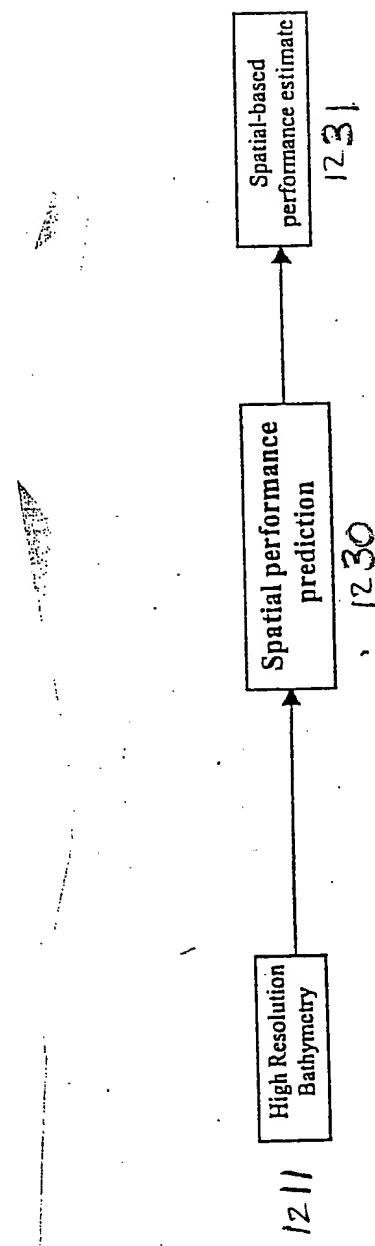
-Input/Output diagram for the state velocity update

Figure 10



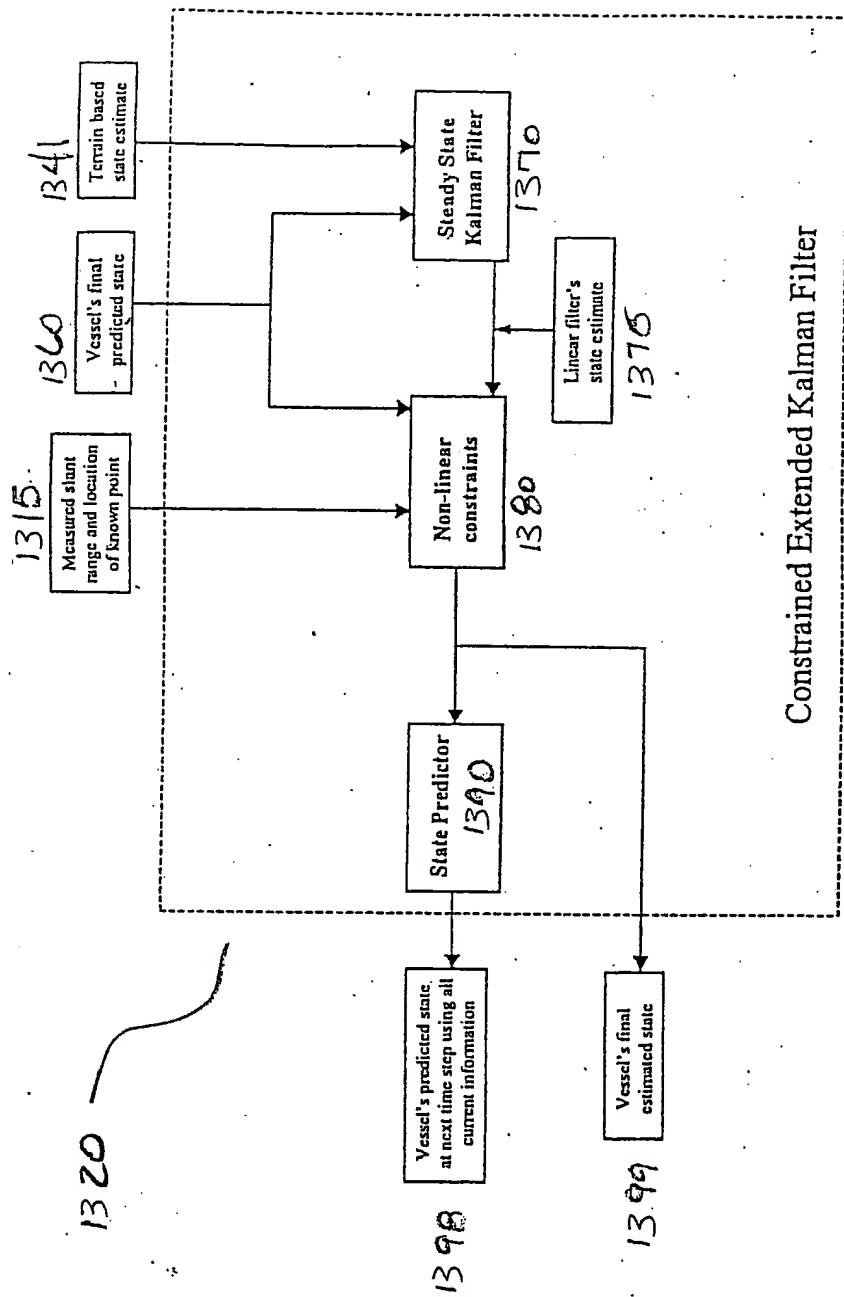
-Input/Output diagram for the terrain matching module

$F_{out} = 1$



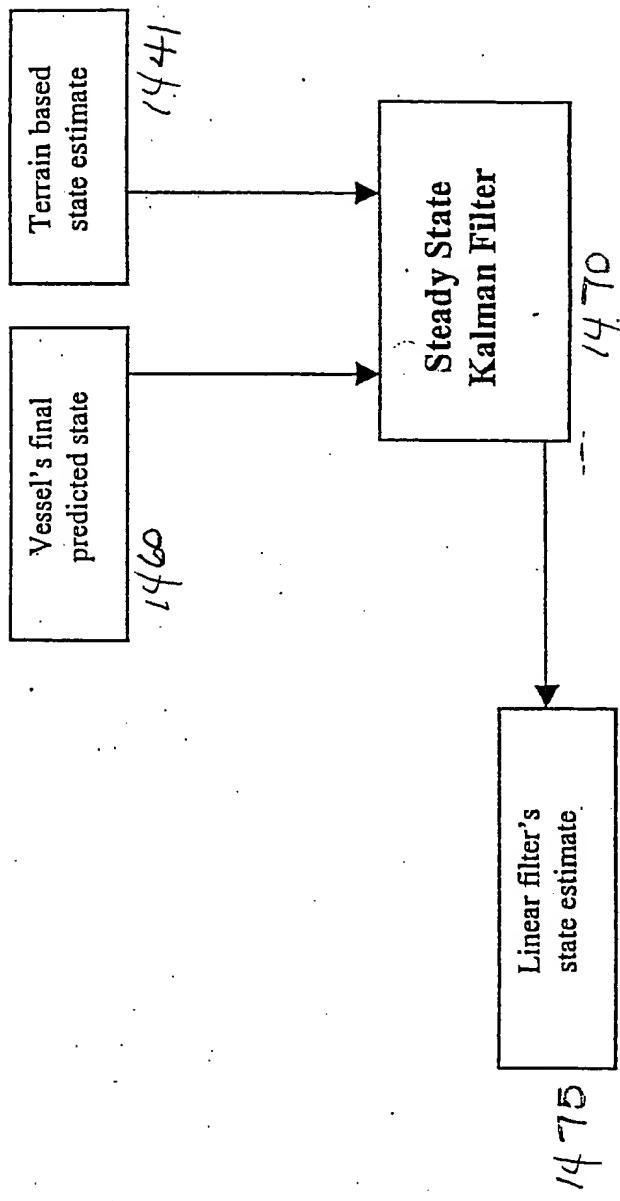
Input/Output diagram for the spatial based performance prediction
module

Figure 12



Block diagram of the constrained extended Kalman filter subsystem showing the signal flow

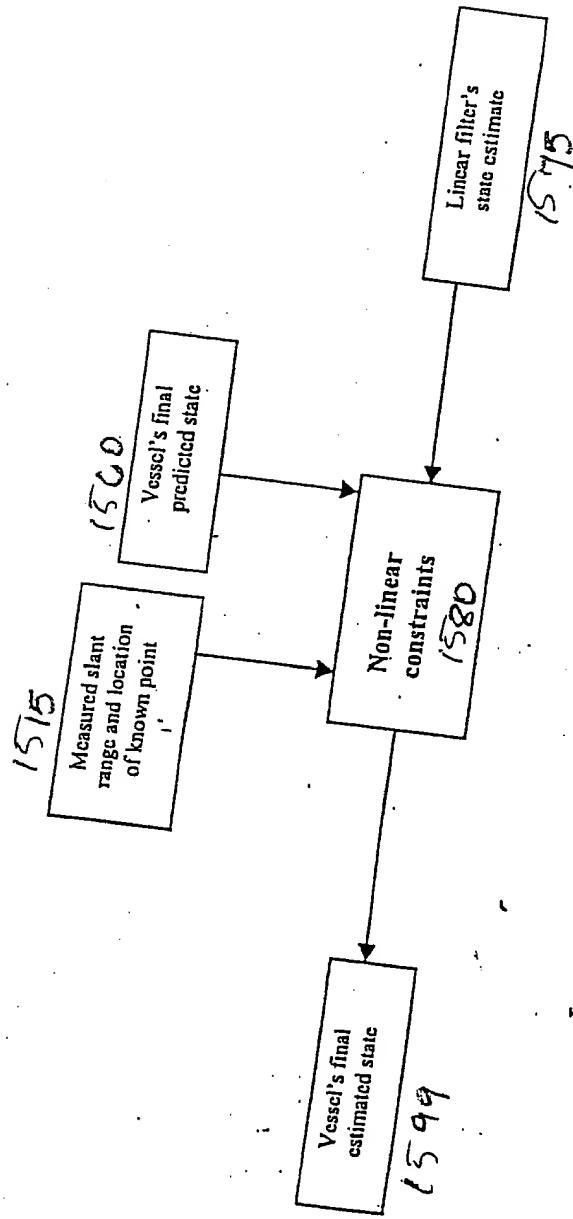
Figure 13

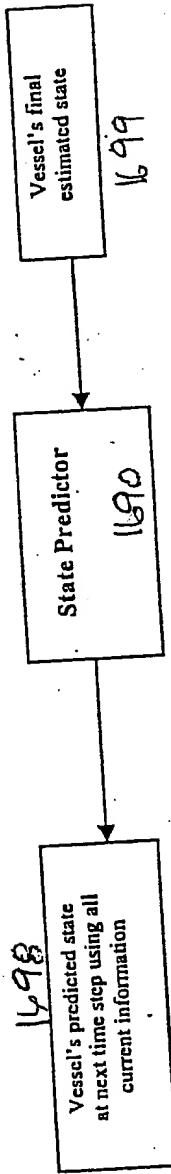


Input/Output diagram for the steady state Kalman filter

Figure 14

FIGURE 15
Input/Output diagram for the nonlinear constraint module





Input/Output diagram for the state predictor

FIGURE 14